

RMS Japan Earthquake and Tsunami HD Model

Advanced HD Modeling Methodology for Japan Earthquake Risk Including Fully Probabilistic Tsunami Module



KEY FEATURES AND BENEFITS

- Provides the most sophisticated and up-to-date view of earthquake risk for Japan
- Comprehensive solution accounting for earthquakes, tsunami, fire following earthquake, liquefaction, and landslides
- Incorporation of the latest research on earthquakes allows for better representation of the risk variation across Japan
- Superior vulnerability functions calibrated against billions of dollars of claims data facilitate risk differentiation
- Robust solution through collaboration with local experts, scientific agencies, and insurers

Robust View of Japan Earthquake Hazard

The RMS® Japan Earthquake and Tsunami HD Model incorporates key research advancements from the 2017 Japan Seismic Hazard Maps, as well as key lessons learned from the 2011 Tohoku Earthquake and 2016 Kumamoto Earthquake.

Leveraging a substantial amount of detailed damage statistics and claims data from recent events, the Japan Earthquake and Tsunami HD Model assesses building performance due to ground shaking, tsunami inundation, fire following earthquake, liquefaction, and landslides. The inclusion of these five sources of potential property damage and business interruption losses provides a comprehensive solution for managing and differentiating the risk posed by earthquakes in Japan.

Comprehensive Solution for Earthquake Risk

The 2011 Tohoku event magnitude of 9.0 was significantly greater in size than expected based on the Japan Seismic Hazard Maps published at the time. Following the 2011 event, several extensive research projects were undertaken for the key subduction zones surrounding Japan that drive the seismic hazard and risk.

The goal of these studies was to understand the timing of past events and the potential for future events, including ones larger than those observed historically. The Japan Earthquake and Tsunami HD Model utilizes these research studies to provide the most robust view of the seismic hazard and risk for Japan.

Fully Probabilistic Tsunami Model

The 2011 Tohoku earthquake initiated a series of devastating tsunami waves. The impact of the tsunami highlighted the importance of this sub-peril to the quantification of the financial risk posed by large offshore earthquakes. The Japan Earthquake and Tsunami HD Model incorporates a fully probabilistic tsunami model that is integrated with the earthquake stochastic event set, allowing for assessment of the combined risk posed by earthquakes and their resulting tsunami.

CLIENT SUPPORT

- Global Client Support services ensure continuous availability of knowledgeable support staff, fulfillment and deployment services, RMS experts, and product and industry training
- Access to comprehensive, transparent documentation, including model methodology, model validation, and model change documents
- When a catastrophe occurs, the RMS Event Response Team provides accurate accumulation, modeling, and loss estimation information and guidance to clients and the market

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RMS is the world's leading catastrophe risk modeling company. From earthquakes, hurricanes, and flood to terrorism, agriculture, and infectious diseases, RMS helps financial institutions and public agencies understand, quantify, and manage risk.

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HD MODEL BENEFITS

- ✓ Utilizes the RMS earthquake high-definition (HD) model
- ✓ Simulation-based framework enables tens of thousands of realizations of earthquake losses in a future year
- ✓ Fully probabilistic tsunami model linked with stochastic earthquake events provides a more complete understanding of earthquake risk in Japan
- ✓ Advanced liquefaction and landslide modeling better differentiates exposures at risk to these key sub-perils of earthquake risk
- ✓ Financial HD model can assess Japan-specific policies and terms (e.g., step policy)

Model Enhancements

Post-Tohoku research has driven scientific advances in earthquake hazard and risk modeling, and RMS has collaborated with local experts, scientific agencies, and insurers to develop the model for a more complete representation of earthquake risk in Japan.

This model features probabilistic tsunami, fire following earthquake, liquefaction, and landslide – and was built in the RMS earthquake high-definition (HD) model framework. Enhancements include:

- **Complete update of source model components:** The model integrates the latest underlying science and data from the 2017 Japan Seismic Hazard Maps* and incorporates comprehensive geotechnical data layers from numerous Japanese agencies.
- **Inclusion of probabilistic tsunami as a new sub-peril:** Based on a full hydrodynamic model of tsunami events generated on local earthquake sources and modeled at very high resolution.
- **Redesign and recalibration of liquefaction model for Japan:** Based on lessons learned from recent major liquefaction events in New Zealand, RMS researchers redesigned the RMS liquefaction model framework for Japan. It uses Japan-specific data to more accurately assess liquefaction risk at the local level.
- **Vulnerability curves and inventory distributions reflect Japan construction:** The model captures the current local building codes and construction practices that are reflected in a comprehensive set of vulnerability curves and detailed building inventories, which reflect current building stock distribution in Japan.
- **Introduction of a unique financial HD model:** The financial HD model expresses a wide range of contracts, including implementation of Japan-specific policy structures and terms (e.g., step policies).
- **Japan Earthquake Industry Exposure Database:** The multi-peril 2018 Japan Industry Exposure Database (IED) accompanies this model. Available at a city/ward resolution, the IED covers the insured perils of earthquake, tsunami, and fire following earthquake. The Earthquake Fire Expense Insurance (EFEI) exposure covers the additional losses resulting from EFEI policies.

Find Out More

Ask your RMS sales or customer services representative for more information on the RMS Japan Earthquake and Tsunami HD Model, call +44.20.7444.7600, or email sales@rms.com.

*2017 Japan Seismic Hazard Maps: <http://www.j-shis.bosai.go.jp/en>